

REMARKS

The present invention is a balanced antenna for connecting to a balanced power amplifier stage in a portable communications device, a portable communications device and a method of manufacturing a balanced antenna for connecting to a balanced power amplifier stage in a portable communications device. In accordance with an embodiment of the invention, a balanced antenna 7 is provided for connecting to a balanced power amplifier 17 in a portable communications device with the balanced power amplifier including first and second outputs. The antenna comprises a ground plane 24 and first and second antenna elements 20 and 21 spaced apart from the ground plane. The first antenna element lies in a first antenna plane. The second antenna element lies in a second antenna plane and the first and second antenna planes are substantially parallel and spaced apart from each other as may be seen with the embodiments illustrated in Figs. 4, 5, 10 and 12 and 13. Each of the antenna elements has a feed point 25 which is connectable to one of the outputs from the power amplifier stage.

The present invention provides a balanced amplifier which does not require connection to a balanced power amplifier through a conversion network. The connection between the power amplifier and the antenna of the present invention is a direct connection not requiring an impedance matching network. See the last paragraph on page 1 and the top paragraph on page 2 of the specification.

Fig. 10 stands objected to for the omission of reference numeral 25. Submitted herewith is a replacement sheet 8 of the drawings containing Figs. 10, 11a and 11b which includes the missing reference numeral 25.

Claim 17 stands rejected under 35 U.S.C. §102 as being anticipated by United States Patent 6,549,169 (Matsuyoshi et al); claims 1-4, 7-10 and 12-15 stand rejected under 35 U.S.C. §103 as being unpatentable over United States Patent 5,614,863 (Pierro et al) in view of Matsuyoshi et al; claim 5 stands rejected under 35 U.S.C. §103 as being unpatentable over Pierro et al in view of Matsuyoshi further in view of United States Patent 6,424,300 (Sanford et al); claim 6 stands rejected under 35 U.S.C. §103 as being unpatentable over Pierro et al in view of Matsuyoshi et al further in view of United States Patent 6,492,952 (Hu); claim 11 stands rejected under 35 U.S.C. §103 as being unpatentable over Pierro et al in view of Matsuyoshi et al; claim 16 stands rejected under 35 U.S.C. §103 as being unpatentable over Matsuyoshi et al in view of Sanford et al; and claim 18 stands rejected under 35 U.S.C. §103 as being unpatentable over Pierro et al in view of Matsuyoshi et al further in view of United States Patent 6,130,651 (Yanagisawa et al). These grounds of rejection are traversed for the following reasons.

Independent claim 1 recites:

A balanced antenna for connecting to a balanced power amplifier stage in a portable communications device, the balanced power amplifier stage including first and second outputs, the antenna comprising a ground plane and first and second antenna elements spaced apart from the ground plane, wherein the first antenna element lies in a first antenna plane and a second antenna element lies in a second antenna plane and the first and second antenna planes are substantially parallel and spaced apart from each other, and wherein each of the antenna elements has a feed

point connectable to one of the outputs from the power amplifier stage.

Independent claim 16 recites:

A portable communications device comprising a circuit board including a plurality of electronic components mounted thereon and a balanced antenna, the balanced antenna comprising first and second antenna elements mounted to the board, wherein the first antenna element lies in a first plane and the second antenna element lies in a second plane and the first and second planes are substantially parallel and spaced apart from each other, each of the antenna elements having a top edge and a bottom edge, the bottom edge being nearer the board than the top edge, the device further comprising a ground plane disposed between the bottom edge of the antenna elements and the board, the ground plane being electrically isolated from the antenna elements and the board.

Independent claim 17 recites:

A balanced antenna for a portable communications device, comprising a ground plane and first and second substantially similar antenna elements spaced apart from each other and from the ground plane, the first antenna element lying in a first antenna plane and the second antenna element lying in a second antenna plane, wherein the first and second antenna planes and the ground plane are substantially parallel and spaced apart from each other, and wherein the first and second antenna elements are aligned in opposite directions with respect to one another.

Independent claim 18 recites:

A method of manufacturing a balanced antenna for connecting to a balanced power amplifier stage in a portable communications device, the balanced power amplifier stage including first and second outputs, the antenna comprising a ground plane and first and second antenna elements, lying in first and second generally parallel planes, spaced apart from each other and from the ground plane, wherein the antenna elements are arranged to be opposite one another and to overlap to a predetermined extent, and each of the antenna elements has a feed point connectable to one of the outputs from the power amplifier stage, the method comprising varying the extent to which the antenna elements overlap to tune the antenna for use in a predetermined frequency band.

Each of the independent claims recites a balanced antenna (claims 1 and 17), a portable communications device (claim 16) and a method of manufacturing a balanced antenna (claim 18) which recites in substance an antenna including first and second antenna elements disposed in first and second substantially parallel or generally parallel planes which are spaced apart from each other. Moreover, the independent claims recite a spaced apart spatial relationship of a ground plane relative to the first and second antenna elements. This subject matter has no counterpart in the references of record utilized by the Examiner in rejection of the claims.

Matsuyoshi et al disclose antenna elements 101, 111 and 102, 111 lying in the same plane which are spaced from ground plane 105 as illustrated in different embodiments. However, the antenna elements of Matsuyoshi et al are in the same plane and therefore do not meet the aforementioned limitations of the independent claims of the antenna elements being in different planes spaced from the ground plane. Pierro et al do not overcome the deficiencies noted above with respect to Matsuyoshi et al since Pierro et al have been cited for their general disclosure regarding a balanced amplifier/antenna arrangement which is not specific to antenna spacing.

Hu has been cited by the Examiner in the rejection of claim 7 as teaching antenna elements which are substantially perpendicular to the ground plane. However, Hu does not cure the deficiencies noted above with respect to Matsuyoshi et al and Pierro et al. In the first place, it is noted that Hu discloses multiple antenna elements 12 and 14 which are respectively designed for

receiving linearly polarized and circularly polarized waves which is different from the fields of application of Matsuyoshi et al and Pierro et al which have multiple antennas for receiving the same signal. Moreover, the second antenna element 14 is disclosed as being "positioned essentially in the plane of the ground plane 22" as stated at the top of column 4 which is different from the claimed spaced apart relationship of the antenna elements from the ground plane. Moreover, Hu does not disclose operation of an antenna in association with a balanced amplifier as recited in independent claims 1 and 18. There is no basis in the record why a person of ordinary skill in the art would be led to modify the teachings of Matsuyoshi et al alone or in combination with Pierro et al in view of Hu to arrive at the subject matter of the independent claims in view of the above noted differences including that the second antenna is substantially in the ground plane.

The citation of United States Patent 6,424,300 (Sanford et al) and 6,130,651 (Yanagisawa et al), which have been respectively cited for a portable communications device having a printed circuit board which is a ground plane and for overlap of antennas respectively in the rejection of claims 5 and 16 regarding Sanford et al and the rejection of claim 18 regarding Yanagisawa et al, do not cure the deficiencies noted above with respect to the cited references.

The specification has been amended to improve its form for reexamination.

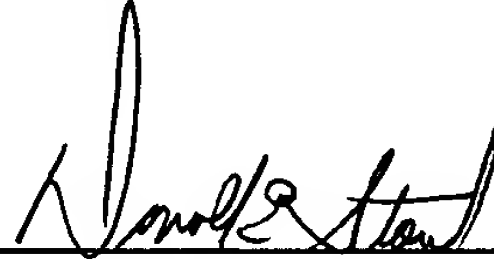
In view of the foregoing amendments and remarks, it is submitted that each of the claims in the application is in condition for allowance.

Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (1076.39608X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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Attachments

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